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ABSTRACT

Jackson and Messick present the beginning of a broad theory of creativity which includes four sets of properties by which outcomes of creative processes can be judged. The properties are unusualness, appropriateness, ability to transform the constraints of reality, and ability to condense meaning. Current tests for creativity generally emphasize only unusualness and--to a very limited extent--appropriateness as criteria for creativity. The present study reanalyzes creativity test results for transformations using aesthetic reactions of judges to creativity test responses, a technique intended to operationalize Jackson and Messick's observation that creative products engender specific aesthetic reactions in the viewer in relation to each response property. Results are compared with standard creativity test scores. The Torrance tests are found to generate low-order creative responses as judged within the Jackson/Messick framework. The subjects who produced the most powerful creative responses are not necessarily those who scored highest on the Torrance tests. (Author)

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UNUSUALNESS, APPROPRIATENESS, TRANSFORMATION AND CONDENSATION AS CRITERIA FOR CREATIVITY[1]

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Guilford's (1950) presidential address before the American Psychological Association marked the beginning of an upsurge of scientific interest in creativity that continues to this day (Albert, 1969; Frierson, 1969). In this address Guilford anticipated the two streams of inquiry that have captured the interest of the majority of investigators of creative behavior. These two streams are (a) the study of the creative personality, and (b) the study of creative thinking abilities. Most of the research that has found its way into educational discussion and practice has come from the second of these streams. The creativity/intelligence controversy, the Guilford and Torrance Creativity Tests, the work of Wallach and Kogan (1965) and Ward (1969a,b) and the teaching strategies of Frank Williams (1969) are examples of research on creative abilities in educational contexts.

What is less often remembered from Guilford's classic paper is that his scope in describing creative behavior was limited to those aspects of creativity dealing with scientific and inventive thought, as the following quote indicates:

> The hypotheses that follow concerning the nature of creative thinking have been derived with certain types of creative people in mind: the scientist and the technologist, including the inventor. The consensus of the philosophers seems to have been that creativity is the same wherever you find it. To this idea I do not subscribe.

Research on creative thinking abilities seems to have lost sight of Guilford's original restriction on the field, and it is now not

uncommon to see researchers and educators alike interpreting results of Torrance of Guilford tests as indicators of "creativity" in a very general sense (Bruininks & Feldman, 1970; Feldman, 1970).

The purpose of the present study is to place the thinking abilities represented by such tests as the Torrance and Guilford creativity inventories in the context of a broader conceptual framework for the analysis of creative behavior. The beginning of a broader conception of creativity is found in a paper by Jackson and Messick titled "The Person, the Product, and the Response: Conceptual Problems in the Assessment of Creativity" which appeared in the Journal of Personality in 1965. The present paper reviews the framework offered for the analysis creative behavior as presented in the Jackson and Messick paper and reports the results of a study which attempted to reanalyze data from a set of Torrance protocols in the light of Jackson and Messick's conceptual scheme.

It was the general hypothesis of the study that the activities of the Torrance tests generate low-level creative behavior (in terms of the Jackson and Messick framework), and that respondents who exhibit the most powerful creative behavior are not necessarily those who score the highest on the Torrance tests.

The Jackson and Messick Conceptual Framework for Creative Behavior

In "The Person, the Product, and the Response: Conceptual Problems in the Assessment of Creativity," Jackson and Messick attempt a conceptual organization of creativity to include qualities of the creative person, standards for judging what he produces, and descriptions of viewer reactions in response to creative products. The effort could be characterized as an attempt to include within

one network those criteria which are specifically pertinent to (a) the person--predisposing cognitive styles, personal qualities; (b) the product--response properties, judgmental standards; and (c) the response--most specifically, the effect upon the viewer, or simply the viewer's reaction (see Table 1).

Insert Table 1 about here

Stimulated by research attempting to distinguish between "intelligent" and "creative" behavior, the authors characterize intelligent responses as "correct"--and therefore operating within the constraints of logic and reality, and creative responses as "good"--consequently not limited by logic and reality but subject to other judgmental standards.

Unusualness, the first criterion for a creative product, is judged according to the relative frequency of the product. The infrequency of a response is found to be relative to norms--hence the judgmental standard for assessing this property is based on the relative merit of a specific product compared with other products within the same domain.

Appropriateness, which relates both to the demands of the producer's intentions as well as to the demands of the situation, is the second criterion. Its judgmental standard is in relation to its context. The response is considered against a continuous criterion for appropriateness ranging from "about right" to "just right."

Transformation, the third criterion, is called "unusualness with a difference" by Jackson and Messick. It is described as a

higher level of development than unusualness. While unusualness is at best an improvement on existing forms, transformation involves the creation of new forms. It is judged with respect to the constraints on reality overcome in the creation.

Condensation, the last criterion proposed, refers to the unified and coherent relationship within the created product between simplicity and complexity; its judgmental standard is summary power. The authors maintain that a hierarchy involving complexity and developmental interdependence exists among these criteria. The order progresses from unusualness through condensation with respect to power.

Aesthetic reaction. The idea of exploring the aesthetic reaction of the viewer to a product was generated by Jackson and Messick out of discussion about transformation. As a higher level response property than unusualness, transformations were noted to engender thought and to provide occasions for reflection and wonder. The authors concluded, "The presence of a transformation may be determined in part by its effect on the viewer." The authors then extended the notion of differentiated aesthetic reactions to the criteria of unusualness, appropriateness and condensation. The unusual product or event typically elicits surprise in the viewer. Surprise requires an experience of improbability that "violates the viewers' expectations." The viewer must assimilate the unusual product into his present cognitive structure.

Satisfaction in recognizing that the demands of the creator and the context have been responded to well and completely were thought to be characteristic of reaction to the criterion of appropriateness. It is an effect upon the viewer that results in both a qualitative

response--"just right"--and a quantitative response--"complete within its context."

The term describing the aesthetic response of the viewer to a transformation is stimulation. Where surprise is evoked by the unusual product that provokes no further thought, transformation causes reflection, which in turn generates thought. The transformation is heuristic; confrontation with transformation requires accommodation of the viewer's existing cognitive structure to the transformed object, "It stimulates him to consider its consequences."

Condensation, the most complex criterion by which to judge the creative product, moves the viewer to savor the created product for its continuing uniqueness, its interplay of the simple and complex. "It is examined slowly, carefully and repeatedly." Savoring, then, is the aesthetic reaction related to the property of condensation.

Jackson and Messick emphasize the complementarity between aesthetic reactions and judgmental standards, as well as the complementarity between criterion properties and judgmental standards. Thus, aesthetic reaction is related to judgmental standards, both of which are related to properties of creative products.

Two important questions posed by the authors regarding the usefulness of aesthetic reaction as a basis for judgment are: "Can the aesthetic responses themselves be used to indicate the presence of the qualities that give rise to them?"; and, "Are the aesthetic responses unique to the viewer of the creative product or do they also appear in the creator himself?" The present study addressed itself to the first of these two questions, but did so within the context of a reanalysis of Torrance creativity test protocols.

Unusualness and appropriateness were operationally defined in terms of the Torrance scoring method, and thus were not systematically studied from the Jackson/Messick point of view. Furthermore, it proved to be feasible to explore only transformations, and these at a low level, since it turned out to be the case that condensations were not produced in response to the creativity test activities.

METHOD

Data collection and analysis

Responses were analyzed from a total of 100 Torrance Tests of Creative Thinking, Verbal Form B, that had been administered and scored by Torrance and his staff. Subjects were high school juniors and seniors, ages 17 and 18; 50 Ss were male, 50 Ss female.

A total of 846 responses qualifying on the basis of the highest creativity strength rating of 2 (according to Torrance's scoring manual, occurring in fewer than 2% of the responses) were analyzed for transformations. A score of 2 was taken as indicating that a response was both unusual and appropriate. (It should be noted that highest rating in Torrance's scoring represents the beginning of the analysis for the present study.) Two judges (both female graduate students in educational psychology) independently rated the responses according to the aesthetic reaction engendered in them by the answers given in response to the activities of the Torrance tests. These ratings are termed "preliminary ratings." A joint analysis was undertaken which provided further refinement of ratings, after which a "final rating" was performed. In analyzing the responses jointly, verbalized criteria for determining a transformation were produced. the data were analyzed for the entire sample and separately for each sex.

Procedure

Ten protocols were used on a pilot basis to work out rating procedures, thus reducing the sample from 100 to 90. Two weeks intervened between rating the pilot protocols and the remaining analyses. In all analyses, the Es attempted to compensate for any change in attitude about scoring by not going through the tests in the same order.

For the preliminary ratings the Es exclusively used the criteria of aesthetic reaction to the responses to identify transformations. For the final ratings, they used a combination of a set of judgmental standards generated from experience with the protocols and aesthetic reactions stimulated by responses. The Es worked out a two-category system of scoring: a "T" and a "t". A "T" meant that a response was transformational and a "t" meant that the E wasn't sure or thought it was less than what a T would be, perhaps "unusual" in the sense that Jackson and Messick used the term. After independently scoring the 90 protocols, each judge had a "preliminary rating" sheet of her judgments of the responses. E_1 went back and edited out some of the inconsistencies and changed reactions she had had while working; E_2 worked with just her original scoring.

The Es then went through the 90 protocols, comparing their scoring of T and t for each "2" response. Items of agreement were recorded; items of disagreement were read aloud and discussed. A larger proportion of agreement was reached in several ways. In some cases one E had made a mistake, had failed to give credit to an answer that had been credited with a T previously, or simply changed her mind when reconsidering. In other cases one E convinced

the other--a case in point was the unusual use of a tin can--"to can gifts and send them." One E thought that this response was a T, the other pointed out that she knew of several local stores where this was done. Three protocols were discarded from the sample because of errors in the Torrance scoring that made it impossible to know which responses were 2s, or because of illegible handwriting.

At this point in the research, both Es felt some certainty about what was a reasonable set of criteria for scoring a response transformational in accordance with the framework of Jackson and Messick. A final system of scoring was devised. A response was marked T if it went beyond the reality of the situation presented in the task. A t was given those responses which approached a T but lacked the heuristic power or the new approach to the subject. Each transformation was scored as one T. If two very similar responses were made from one transformational idea, an effort was made to give only one T. If four responses were given required to complete one transformational idea, one T was given.

Obviously all the tasks on the Torrance test are bound to the immediate task situation--the pictures in activities 1-3, the toy, the tin can, the hypothetical fog situation. Responses were scored as transformational (T) if they did find a new interpretation of that particular reality or reach beyond it, and in so doing lead the reader to think or even formulate a new theory about the situation.

In the Ask and Guess (Parts 1-3), an example of a numerically unusual but non-transformational response would be calling the marks on the wall Nazi symbols. Several students did this, and the judges felt that it was a novel but not remarkable response. One student, however, theorized that all the markings on the wall identified the

shop of a particular craftsman, and thus the elephant was valuable and worth stealing because it was made by this particular man; this was considered to be a T. A T response on the activity asking Ss to improve a toy monkey had to truly transform the nature of the monkey into a new kind of toy. One of the few Ts found in this question suggested we "transform" the monkey into a 3-dimensional puzzle of pieces that could be taken apart and put together again.

A T response to a question asking for new uses for a tin can (activity 5) had to overcome the usual uses (container, preserver) and incorporate the object in a different capacity in the outside world. A shower head with small holes on one side and a hose in the other is an example. Unusual questions (activity 6) about tin cans were generally not transformational, but "Why don't we construct tin cans that self-destruct after we use them?" was judged a question which stimulated a new way of thinking about tin cans. "How much tin is in tin cans?" did not. Activity 7 (fog leaving only feet in view) provided the situation which evoked the most transformational responses--perhaps because it is the least specific. There were many responses which probed the new fog-bound reality and emerged with some startling changes that it would bring to our present society. The disappearance of racial prejudice was a fairly common observational but transformational in cases where students were reaching toward a new perspective. Other T responses broke through into new reality and probed changes in detecting crime, communication, and transportation. One subject specified new dimensions for furniture, another stated simply "midgets will have the best deal."

RESULTS

Three sets of results are reported: agreement on "preliminary ratings," agreement on "final ratings," and comparison of high scorers on the Torrance test with those who produced the most powerful transformations.

Preliminary Ratings

Of the 846 responses given a "2" rating (high creative strength) by Torrance's scoring technique, 339 were rated by the judges in the present study as showing some evidence of transformational power (i.e., given a T or t rating). Of these 339, 104 (or 30.5%) of the responses were rated as showing transformational power by both judges. For the T ratings, 63 of 181 responses (35% agreement) were chosen by both judges; for the t ratings, 36 of 153 (24% agreement) were chosen by both judges. An additional five responses were chosen by both judges but given opposite ratings. The fact that one judge went back over her ratings and the other did not contributed to the relatively low level of agreement between judges.

Levels of agreement between judges for boys' versus girls' responses produced some differences in magnitude, but the percentages remained relatively low for both groups. The highest percentage agreement between judges was 39% (37 of 96) for boys' T responses; lowest agreement was 14% (11 of 78) responses for boys' t responses. Of the responses that both judges rated T or t, boys had 37 T responses to 26 for girls, but girls had 25 t responses to 11 for boys.

Final Ratings

Final ratings were done after joint consideration of verbally

stated criteria, but were in all other respects similar to the preliminary ratings. Of the 846 responses rated "2" by Torrance's staff, 225 (or slightly more than one in four) were rated T or t by one or both raters; of these, 162 (or 72%) were in exact agreement. For T responses, agreement between judges of 80% (93 of 116) was achieved; for t responses, agreement of 63% (69 of 109) was recorded. Thus, fewer than one in eight of Torrance's high creative strength responses was agreed by the judges to have transformational power.

Separate analyses by sex produced no significant differences in levels of agreement between judges. As in the original ratings, however, boys produced a greater number of transformations (52 to 41), while girls produced more "unusual" (t) responses (41 to 28).

Rank Order

To determine if those who produce transformations of the greatest power are also the highest scorers on the Torrance test, the judges chose the six most powerful transformations (Ts) among the 93 thus rated. An even number was chosen so that equal numbers of boys and girls could appear in the top six; the judges had little difficulty in agreeing on the six most powerful Ts. The results of this analysis are presented in Table 2. As shown in Table 2, the six most powerful Ts were produced by three boys and two girls (one boy had two Ts in the top six). The rank of the five subjects in terms of Torrance's Fluency + Flexibility + Originality score were 2, 8, 11, 57 and 79 out of 87 subjects. Thus, three of the subjects were among the higher scorers on the Torrance test and two clearly were not. The boy who had two among the top six transformations was ranked 57th.

Insert Table 2 about here

SUMMARY AND DISCUSSION

The main purposes of the study were to explore the propositions that the abilities assessed by creativity tests such as Torrance's represent a subset of creative abilities, relevent primarily to technological inventiveness; and, that the broader conceptual framework for creative behavior proposed by Jackson and Messick (1965) could be used as a basis for empirical study of creative behavior relevant to many domains. Specifically, it was hypothesized that responses to the Torrance Verbal Test are generally of low creative power in terms of the Jackson and Messick conceptual scheme, and that the people who make the most powerful transformations are not necessarily those with the highest Torrance test scores on Fluency + Flexibility + Originality.

For the most part, the hypotheses were supported by the data. Out of 846 "high creative strength" responses, 225 were judged to have some transformational power, 93 were considered bona fide transformations, none of these was judged to be of very great power. Both judges agreed that the Torrance tests do not lend themselves to the production of high-powered creative responses (within the Jackson/Messick framework).

The following tentative conclusions can be made, based on the results of the present study:

1. The criteria for creative behavior suggested by Jackson and Messick (unusualness, appropriateness, transformation, and condensation) have promise as useful criteria for a broader conception of creativity.
2. The Torrance tests (Verbal Form B) generate behavior which is low creative in power in terms of the Jackson and Messick

framework. Condensations are absent altogether; transformations are of a low order.

3. It is possible to reach a relatively high level (about 80%) of agreement on aesthetic reaction to responses on the Torrance Verbal test. It is not possible to achieve this agreement, however, until one is able to generate a set of judgmental standards within which to respond. In other words, as in other field in which judgments about quality are made, one must become "expert" in that field before aesthetic reactions can be reliable. There must be a context, a frame of reference. This notion was implied in the Jackson and Messick scheme but was not related to our rating technique until it became a necessary step in order to achieve agreement. The judgmental standards also have to be much more content specific than those summarized in Table 1.

4. Boys produced more transformations than girls; girls produced more "unusual" responses (in Jackson and Messick's terms) than boys.

5. The highest scorers on the Torrance test were generally not the same individuals as those who produced transformations of the greatest power. Out of a sample of 87 subjects, those who produced the most powerful transformations were ranked 2, 8, 11, 57, and 79 in total Torrance score (with low numbers representing high scores). The only subject who had two among the top six transformations was ranked 57th out of 87.

Future studies should explore the usefulness of scales of creative responses within the Jackson and Messick framework. Perhaps some of the confusion arising from the difficulty in judging creative

responses in different contexts can be reduced: for example, whether or not one should label as "creative" the unusual finger painting of a first-grade child, the winning work of the high school art festival, or the works in a show at the Metropolitan Museum of Art could be decided through the use of a common conceptual framework with varying degrees of quality. Creative responses may thus be shown to be related to each other in both a qualitative sense (i.e., share some attributes) and a quantitative sense (i.e., be shown to differ in the degree to which they possess these common attributes).

Interpretations of the results of this study should be tempered with the knowledge that it was exploratory and imperfect in both design and execution. Especially needed are confirming results based on a new set of protocols. The results should be encouraging, however, to others wishing to explore broader conceptions of creativity on an empirical basis; they should not be cited as evidence demonstrating the validity of the conception here explored nor as establishing aesthetic reaction as a reliable method for judging creativity until additional empirical data are available.

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Footnote

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TABLE 1

Conceptual Scheme Relating Creative Behavior to Aesthetic Response*

Response Properties	Judgmental Standards	Aesthetic Responses
unusualness	norms	surprise
appropriateness	context	satisfaction
transformation	constraints	stimulation
condensation	summary power	savoring

*From Jackson & Messick (1965).

TABLE 2

Torrance Test Scores and Rank of Subjects Judged to have Produced the Six Most Powerful Transformations

Subject Number	Sex	Torrance Total Score	Torrance Flexibility Score	Rank (out of 87)	Activity Number	Transformation
34	F	296	74	2	7	"Prejudices concerning faces would disappear, but new ones would develop concerning feet."
44	M	229	59	8	6	"Why not make a tin can that destroys itself after being used so as not to litter highways."
10	M	194	36	11	5	"Capture good oxygen from polluted air."
45*	M	108	27	57	7, 7	"Babies would never learn how to walk because crawling would be better." "The midgets would have the best deal."
14	F	74	23	74	7	"Murders could not be witnessed and therefore not tried."

*NOTE - This subject had two of the six transformations judged to be most powerful.